BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

CG

Consumer and Corporate Affairs Canada | Consommation et Corporations Canada

(11) (A) No. 1 274 979

(45) ISSUED 901009

(52) CLASS 40-23
C. R. CL. 26-111

(51) INT. CL. [4] G09F 3/04, B31D 1/02

(19) (CA) CANADIAN PATENT (12)

(54) Clean Release Label and Method of Production

(72) Doll, Gary W.,
U. S. A.

(73) Granted to Standard Register Company (The)
U. S. A.

(21) APPLICATION No. 427,391

(22) FILED 830504

(30) PRIORITY DATE (US) U. S. A. (376,788) 820510

No. OF CLAIMS 4

Canada

427391

Abstract of the Disclosure

A clean release label or the like is produced by lamination of a plurality of sheets, including a face sheet and a backer sheet. The laminating process is performed by use of a selected fugitive adhesive which attaches the sheets together. Then one or more of the laminated sheets is die cut and a portion thereof is removed as a matrix. A remaining portion of the sheet constitutes a removable label or the like which is carried by the backer sheet. The label is removable from the backer sheet as cohesive failure occurs in the fugitive adhesive. Therefore, the label and the portion of the backer sheet from which the label is removed are non-tacky and non-waxy.

A three ply embodiment of this invention comprises a clean release product comprising a face sheet attached to a backer sheet by fugitive adhesive. The backer sheet is attached to a silicone release surface of a carrier sheet by a pressure sensitive adhesive applied to the back of the backer sheet. Labels are formed as the face sheet and backer sheet are die cut followed by removal of the matrix. The face sheet and backer sheet as a unit are either manually or mechanically separated from the carrier sheet and attached by the pressure sensitive adhesive to a business form or other suitable surface. The face sheet may be printed upon before or after attachment of the two ply unit to the business form. Then the face sheet is separated from the backer sheet. The face sheet thus serves as a label, identification card, or the like, having a clean back surface and leaving a clean exposed surface of the backer sheet, which remains attached to the business form by the pressure sensitive adhesive.

CLAIMS:

1. A laminate structure forming a plurality of clean release identification items comprises a backing sheet, a face sheet cov ring at least a portion of the backing sheet and being die cut to define the plurality of clean release identification items, fugitive adhesive attaching the face sheet to the backing sheet so that the identification items defined in the face sheet and the backing sheet are readily separable without a tacky surface on the identification items or on the portions of the backing sheet from which the identification items are separated, a release coated carrier sheet, pressure sensitive adhesive attaching the carrier sheet to the backing sheet so that the backing sheet is removable from the carrier sheet and adhesively attachable to another surface.

2. A laminate structure as claimed in claim 1 wherein said release coated carrier sheet comprises silicone material.

B

3. A method of producing clean release identification items, such as labels, identification cards, nameplates, or the like comprising:

applying fugitive adhesive to a web of backing material,

laminating the web of backing material and a web of face material into a first laminated web by means of the fugitive adhesive,

introducing a carrier web having a release surface,

applying a pressure sensitive adhesive material to the release surface of the carrier web,

attaching the carrier web to the backing material of the first laminated web by means of the pressure sensitive adhesive material,

die cutting through the face material of the first laminated web to form the identification items, and

removing a matrix from around the identification items to form an identification unit which is attachable to another surface by removal of the carrier web to expose the pressure sensitive adhesive, the identification items then being readily available for removal from the backing material by cohesive failure in the fugitive adhesive.

4. The method of claim 3 wherein the release surface of the carrier web comprises silicone material.

B

CLEAN RELEASE LABEL AND METHOD OF PRODUCTION

Background of the Invention

In numerous types of business and industry it is desirable to produce labels, or nameplates or identification cards, credit cards, sheets of stationery or the like in large quantities, in which each item has specific indicia printed thereupon, and in which such indicia or a portion thereof is different from the indicia printed on any of the other items. Such printing is usually performed by high-speed printing apparatus, such as by means of ink jet printing or the like.

It is desirable to produce such labels, nameplates, identification cards or sheets of stationery or the like on a continuous web as such items are adhesively attached to the web.

Normally, labels are attached by pressure sensitive adhesive (PSA) to a silicone coated release paper. Customarily, when the pressure sensitive adhesive label is removed from the silicone coated release paper carrier web, the label is attached to another surface by means of the tacky adhesive surface of the label. However, in several types of situations it is desirable to have both surfaces of a label and also the web surface from which the label is removed clean and non-tacky. Such labels are known as clean release labels. Such labels are typically variable indicia labels and applications for such labels are sew-one labels for garments, nameplates, and identification cards.

One current method of producing clean release labels is that of reversing the conventional PSA label. That is, the silicone coated release ply is die cut to form labels and the PSA coated paper serves as a carrier web or backer sheet. When these labels are separated from the carrier

web, the labels are free of tacky PSA adhesive. However, the backer sheet or ply has tacky PSA adhesive exposed both after removal of the matrix (trim portion) and after removal of the label. This creates a messy handling situation due to the fact that the PSA surface tends to adhere to itself and to other surfaces. Furthermore, another disadvantage is that the silicone release coated label has less than a satisfactory appearance and an undesirable slippery feeling, compared with typical label papers.

One effort to overcome the disadvantages of this reversed PSA clean label product has utilized an adhesive with controlled adhesion to bond the label ply to the backer ply. After the labels are die cut and the trim removed, the labels are ready for customer imaging, followed by removal of the labels. This approach is deficient because of variations in adhesive properties. Either the labels have such low adhesion that they fall off the backer web during processing, or the adhesion is so high that the labels delaminate and tear during removal. Maintaining the desired degree of adhesion with controlled release adhesives has been most difficult. Minor differences in process conditions, paper porosity and wettability, and other variables result in excessive differences in adhesion.

Another approach to construction of clean release labels to avoid delamination or tearing of the labels during removal from a carrier web is that of laminating or extruding polymer films to the back of the label ply or to the front of the backer ply or both. When these plies are adhered together by a controlled release adhesive, separation of the labels from the backer ply is less likely to result in tearing of the labels or the backer ply. The film

surfaces strengthen the paper webs and also provide a more uniform, less absorbent surface at the interface with the adhesive. However, this is a costly and complex method, and often does not provide the uniform release property desired.

These prior art approaches rely on failure of adhesion at the interface between the adhesive layer and the label surface for controlled release. It is difficult to control adhesion at the desired level (sufficiently high adhesion for processing and low enough adhesion for easy removal of the clean labels) as a result of the critical conditions at the paper/adhesive interface.

The present invention takes the novel approach of utilizing a special class of adhesives which are referred to herein as fugitive adhesives. These fugitive adhesives exhibit cohesive (i.e., internal film) failure instead of the usual adhesive/adherent interface failure. These cohesive failure adhesives are relatively weak compositions that adhere well to paper and similar surfaces. Failure occurs within the fugitive adhesive film itself when subjected to peeling stresses. This class of adhesives can be formulated to provide a range of consistent cohesive strength values. This controlled cohesive failure concept utilizes water based, solvent based, or hot melt systems. For a variety of reasons, water based systems are preferred.

An important feature of fugitive adhesives, as contrasted with the controlled release adhesives of the prior art, is that they can be formulated in a systematic manner to achieve any peel strength desired within a broad range.

In fact, a peel strength can be chosen at a magnitude or degree between the limits of product functionality--that is, between a peel strength so low that the labels fall off during handling, and a peel strength so high that the labels cannot be removed without tearing them. Obviously, both these limits are beyond product functionality, but good functionality lies somewhere between these limits. Also important, and one of the truly valuable features of this invention is that once the desired peel strength is chosen, this property can be easily and reliably repeated in batch after batch by simply controlling the adhesive composition and the amount of adhesive applied. Thus, product uniformity is assured.

Originally, the class of adhesives, known as fugitive adhesives, were developed for temporary fastening of carbon plies to bond paper plies in continuous business forms. This technique utilized a thin line or a series of small spots of glue in the margin(s) of the form to maintain the carbon tissue in register with the adjacent bond ply. In such usage, after high speed printer imaging, the fugitive adhesive fails during the decollating operation, without tearing of the paper or carbon tissue plies.

In regard to this invention, when this cohesive failure occurs with clean release labels, a thin film of adhesive remains on the back surface of the clean label and on the face of the backer ply. However, this adhesive film has no adverse effect on the appearance or the handling characteristics of the labels.

The preferred process for coating such fugitive adhesives is blade coating, which results in uniform smoothness of the adhesive film, and provides ease of control of process variables to obtain the desired adhesion. Slot and other coating processes can also be used. Paper properties such as wettability and absorption of adhesive of the label and backer plies can affect the degree of adhesion. Control of adhesion also is provided by selection of adhesive compostions and varying process conditions.

Another embodiment of the clean release label according to this invention is a three ply version. Essentially, the three ply product comprises a two ply clean release label product with a pressure sensitive adhesive applied to the back of the backer ply in combination with a silicone coated release liner. The labels are die cut as two ply labels which are adhered to the release liner. The two ply label is either manually or mechanically separated from the release liner and applied in register to a business form or other suitable surface. Following high speed printer imaging or other operations, the label can be separated from the business form, leaving a clean exposed surface of the backer sheet portion of the label bonded to the business form by the PSA layer.

Applications for these two and three-ply clean release labels include garment, shelf, and other labels, identity, membership, and credit cards, and hidden features for games, contests, and lotteries. Frequently, word processing systems require clean edge letterheads that are free of perforation ties that result from bursting of continuous forms.

This clean label approach can be used to provide clean edge letterheads that are releasably bonded to a carrier web. For some applications, the capability of applying variable information is an important feature. In other instances, security is an important attribute.

It is an object of this invention to provide such items as labels, nameplates, or identification cards and the like which can be firmly adhesively carried by a continuous web without separating from the web during production and during storage and shipment, and during customer printing of variable indicia.

It is another object of this invention to provide such a method of production by which the labels, nameplates, or identification cards or the like can be easily removed from the web when desired.

It is an object of this invention to provide such a method by which such items which are removed from a continuous web are free from tacky or sticky material, and in which the web from which the labels are removed is also free from tacky or sticky material. Thus, neither the item nor the web is tacky after removal of the item from the web. The items are therefore referred to as "clean" labels.

Other objects and advantages of this invention reside in the construction of parts, the combination thereof, the method of production and the mode of use, as will become more apparent from the following description.

Brief Summary of the Invention

This invention provides an item which is referred to as a clean release label, which is readily removed from a carrier sheet or web without tearing or delamination and which when removed does not have a tacky surface and in which the surface portion of the web or sheet from which the label is removed is not tacky. This invention also includes a method of production of such clean release labels.

A plurality of continuous webs of paper-like material or other material are laminated by adhesive material which is located therebetween. Preferably, at least one of the webs is paper or paper-like material. The adhesive material which binds at least two of the webs together has low cohesive strength and bonds readily to paper, and is non-tacky when dry.

Brief Description of the Views of the Drawings

FIG. 1 is a diagrammatic perspective view illustrating the method of lamination of a plurality of sheets as the first step in production of labels in accordance with this invention.

FIG. 2 is a diagrammatic perspective view illustrating subsequent steps in production of labels in accordance with this invention.

FIG. 3 is an enlarged plan view taken substantially on line 3-3 of FIG. 2.

FIG. 4 is an enlarged plan view taken substantially on line 4-4 of FIG. 2.

FIG. 5 is an enlarged plan view taken substantially on line 5-5 of FIG. 2.

FIG. 6 is an enlarged plan view taken substantially on line 6-6 of FIG. 2.

FIG. 7 is a fragmentary perspective view of a backing sheet and a plurality of labels produced in accordance with this invention.

FIG. 8 is an enlarged fragmentary sectional view taken substantially on line 8-8 of FIG. 7.

FIG. 9 is a diagrammatic perspective view illustrating another embodiment in the method of labels in accordance with this invention.

FIG. 10 is an enlarged fragmentary sectional view taken substantially on line 10-10 of FIG. 9.

Detailed Description of the Invention

FIG. 1 shows a roll of backing material 16 and a roll of face material 18. The backing material 16 is preferably paper or paper-like material, but may be any other suitable material. In the production of labels, the face material 18 is usually paper or paper-like material. However, in the production of identification cards or credit cards or nameplates in accordance with this invention, the face material 18 may be other than paper or paper-like material. For example, the face material 18 may be a flexible plastics or metallic material or the like. The face material can be back printed with appropriate register marks if the application requires that the label be printed on both sides.

The backing material 16 extends in a web from the roll thereof as the backing material 16 engages several rollers 20. The backing material 16 then engages a drum 24 which has a blade 26 in juxtaposition therewith. The blade 26 and the drum 24, with the backing material 16, contain a quantity of fugitive glue 30, which is thus coated upon the backing material 16 as the web thereof travels around a portion of the drum 24. The web of backing material 16 then extends from the drum 24 to a position between a drum 34 and a drum 36.

The face material 18 extends from the roll thereof in a web which engages rollers 40. The face material 18 extends to a position between the drums 34 and 36. As the backing material 16 and the face material 18 come into engagement one with the other and travel between the drums 34 and 36, pressure is applied to the backing material 16 and to the face material 18. Thus, the backing material 16 and the face material 18 are adhesively attached together and laminated by the coating of fugitive adhesive 30 which is applied to the backing material 16 at the drum 24.

The laminated backing material 16 and the face material 18 extend as a web from the drums 34 and 36 to a drum 44 and encompass a portion of the drum 44 and then travel through an oven 50 within which the fugitive glue 30 is dried. The web of backing material 16 and the face material 18 is shown extending from the oven 50 and engaging rollers 56 as the laminated web extends to a rewind drum 60 and is wound thereupon.

The laminated web of the backing material 16 and the face material 18, in its rolled condition upon the drum 60, may then be stored for future use or transported to another location for further use.

In the final steps of production of labels according to this invention, the laminated web of backing material 16 and face material 18 is unwound from the drum 60, as illustrated in FIG. 2. The web is shown extending from the drum 60 to engagement with a roller 64. The web then extends to print apparatus 68 which applies ink 70 to the face material 18 in a desired configuration, as the web travels between drums 72 and 74.

The web then travels over a roller 78 and through a drier 80, then around rollers 84, 86, and 88 to die cut cylinders 90 and 92. As the web travels to the die cut cylinders 90 and 92, the face material 18 may appear generally as illustrated in FIG. 3, as the face material 18 carries printed indicia 94 which was applied thereto by the print apparatus 68 in selected spaced-apart areas of the face material 18.

The die cut cylinders 90 and 92 sever the face material 18. As the web travels from the die cut cylinders 90 and 92, the face material 18 of the web appears generally as illustrated in FIG. 4, with severance lines 96 dividing the face material 18 into distinct label portions 100 and a matrix portion 104. The die cut cylinders 90 and 92 also apply perforation fold lines 134 to the backing material 16.

The web then travels in engagement with rollers 106 and 108 and then to a roller 112 at which the matrix

portion 104 of the face material 18 is separated from the web, and the matrix portion 104 appears substantially as illustrated in FIG. 5. The matrix portion 104 is wound upon a drum 116.

The backing material 16 with the label portions 100 carried thereby travels from the roller 112 to a roller 120 and the backing material with the label portions 100 thereupon has an appearance generally as illustrated in FIG. 6.

The web consisting of the backing material 16 with label portions 100 carried thereby, may then be folded into a fan-fold stack arrangement 130, along the perforation fold lines 134, as illustrated in FIG. 2. The fan-fold stack 130 may be stored or transported to another location for use of the label portions 100.

A label portion 100 may be removed from the backing material 16 in the manner illustrated in FIG. 7 by a peeling action. The label portion 100 has no tacky surface and the portion of the backing material 16 from which the label portion 100 is removed is not tacky. The label portion 100 may thus be attached to a garment of clothing or to another element as the label portion is sewed or otherwise attached to the other element.

The label portion 100 may comprise an identification member such as a nameplate, credit card or identification card or the like.

A suitable fugitive adhesive 30 may be chosen from

a series of blends of polyvinyl acetate and polyethylene emulsions. This series is formulated by varying the ratio of these two emulsions. Such a series is available from H. B. Fuller Company. Representative members of the series, designated by the manufacturer's code numbers, are W3836-XPN, CX-3879, CX-3879X, and CX-3880. The peel strength of this series progresses from lowest to highest in the order listed. The preferred member of the series is CX-3879X. Convenient physical properties for such an adhesive are: viscosity 3500 to 4500 centipoises at 30 degrees centigrade, specific gravity 0.98 to 1.15 grams per cubic centimeter, oven dry solids content of 43 to 58%, and pH from 4.5 to 8.5.

The adhesive 30 is applied by the blade 26 or by any other suitable process at a rate of about 3.0 to 22.0 grams per square meter, preferably 3.0 to 12.0 grams per square meter, dry weight.

The fugitive adhesive has a low cohesive strength, bonds well to paper, and is non-tacky to the touch when dry. It also provides uniform non-fiber tearing clean release from paper. Preferred release levels may be in the range of 100 to 500 grams per 5 centimeters of width, but the preferred range is 150-300 grams per 5 centimeters of width, although higher and lower values are functional. The release test is conducted at 90 degree peel at 1500 centimeters per minute, as the backing material 16 is pulled from the face material 18. A suitable adhesive may be generally identified as one in which cohesive failure occurs as a label portion 100 is peeled from the backing material 16. Cohesive failure is defined as that which occurs within the layer of adhesive

30, rather than failure which would occur at the interface between the label portion 100 and the adhesive 30 or which would occur at the interface between the backing material 16 and the adhesive 30.

It is to be understood that the laminated web of the face material 18 and the backing material 16 does not need to be wound into a roll such as on the drum 60, as illustrated. The laminated web of the face material 18 and the backing material 16 may travel directly from the oven 50 to the print apparatus 68. If printing upon the face material 18 is not desired, the laminated web of the face material 18 and the backing material 16 may travel directly from the oven 50 to the die cut cylinders 90 and 92.

FIG. 9 illustrates another method of production of clean release labels in accordance with this invention. As shown in FIG. 1 and discussed above, a web of backing material 16 is laminated by fugitive adhesive 30 to a web of face material 18 and is wound upon a drum 60. In the method illustrated in FIG. 9, the laminated web is unwound from the drum 60, and travels around the roller 64, and then travels through the print apparatus 68, as shown in FIG. 9. The laminated web then travels through the drier 80, around the roller 84 and then travels to the roller 86.

FIG. 9 also shows a carrier web 140 which is coated with silicone release material or the like.

At the roller 86 the laminated web of face material 18, with the backing material 16 laminated therewith, becomes laminated with the release coated carrier web 140. The

carrier web 140 travels from a roll thereof shown in FIG. 9, and moves to a coating station 146 at which pressure sensitive bonding adhesive 144 is applied to the lower surface of the carrier web 140. Thus, at the roller 86, as the web 140 engages the laminated web of face material 18 and backing material 16, the two webs are adhesively attached together.

The laminated webs 18, 16 and 140 then travel to the die cut cylinders 90, at which label portions 200 are formed. A matrix 150 is then removed from the webs 18, 16, and 140 at the roller 112, and the carrier web 140 carries the label portions 200 from the roller 112. The carrier web 140 may then be folded, as illustrated in FIG. 9, or wound into a roll. The lamination of web 140 with laminated webs 16 and 18 may take place as a separate operation and then be printed and die-cut later.

The carrier web 140, as illustrated in FIG. 10, thus has the layer of pressure sensitive adhesive 144 which firmly attaches the backing material 16 to the release coated web 140. The fugitive adhesive 30 attaches the backing material 16 to the face material 18. Thus, the label portion 200 is carried by the carrier web 140.

The label portion 200 may be removed with its pressure sensitive adhesive coating from the carrier web 140 and adhesively attached to another surface. Then, after customer imaging, the face material 18 may be removed from the backing material 16, as cohesive failure occurs within the fugitive adhesive 30. The face material 18 thus forms a clean label or nameplate or card or the like.

Thus, it is understood that the process of this invention is capable of producing items in the form of clean labels, or tags or cards, or nameplates, or sheets of stationery, or the like at relatively low costs. Due to the fact that neither the item nor the backing material is tacky, the label and the backing material can be easily and readily handled for any desired purpose.

FIG-1

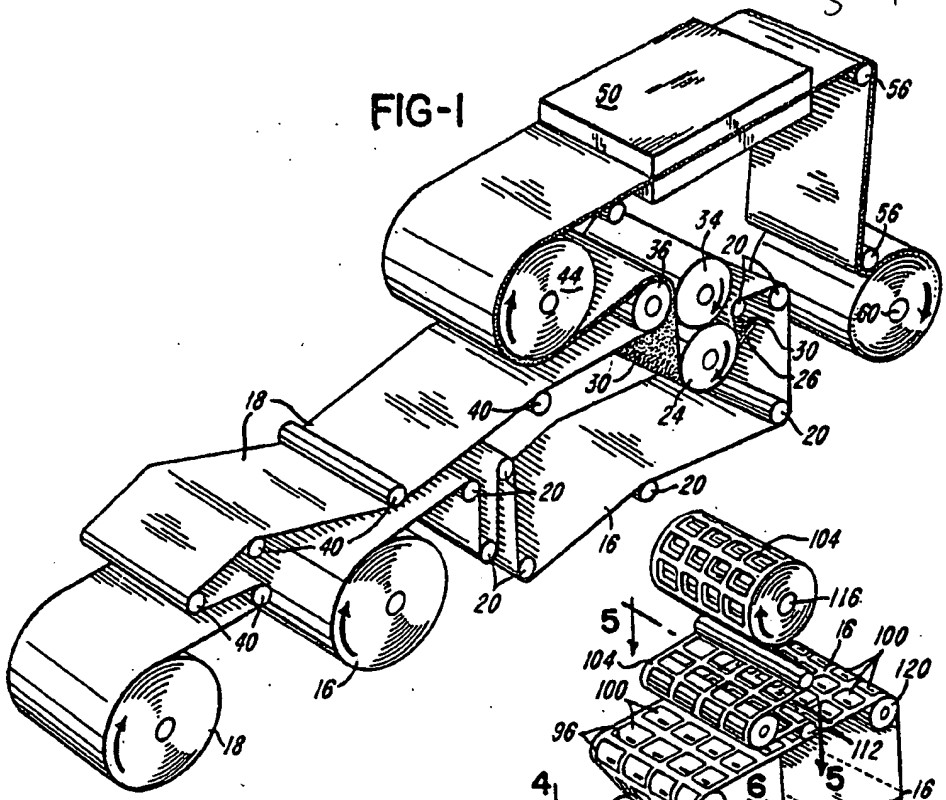
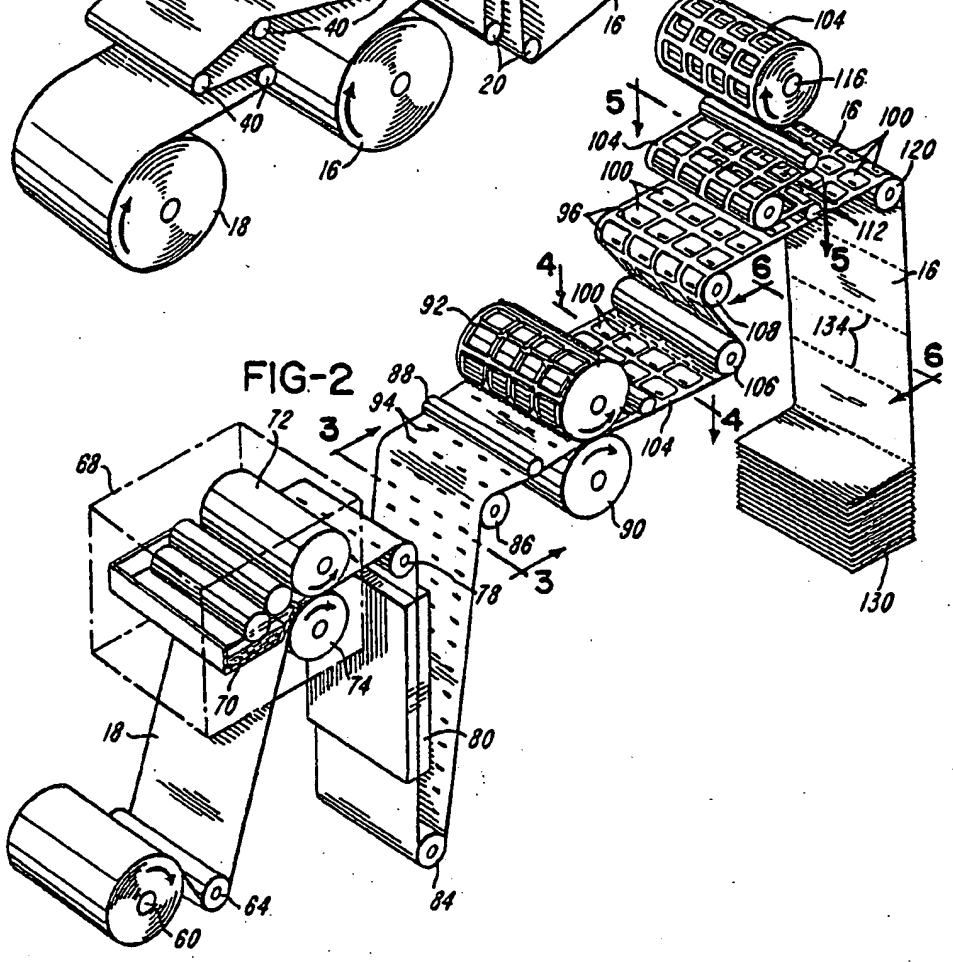


FIG-2



Gowling & Henderson

FIG-3

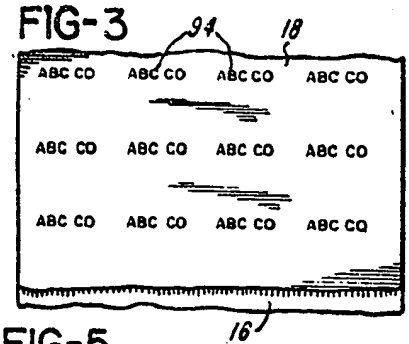


FIG-4

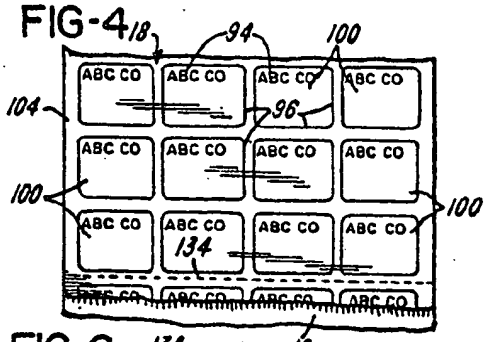


FIG-5

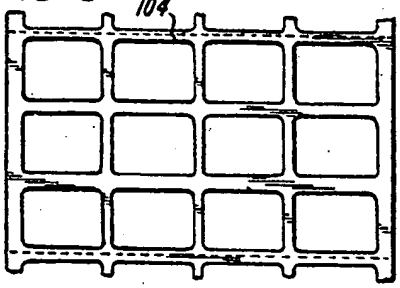


FIG-6

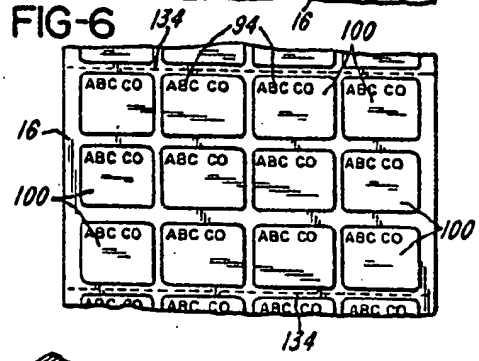


FIG-7

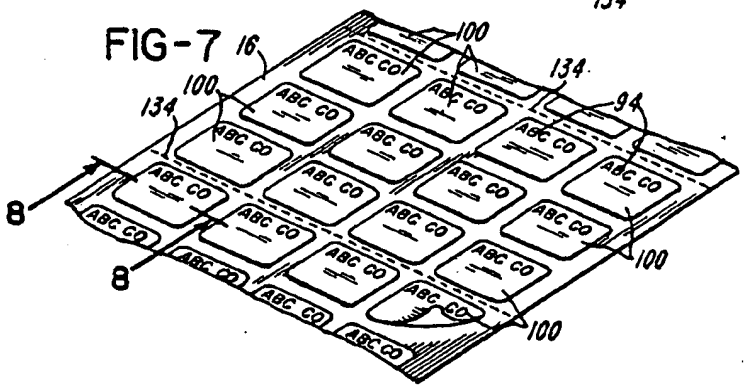
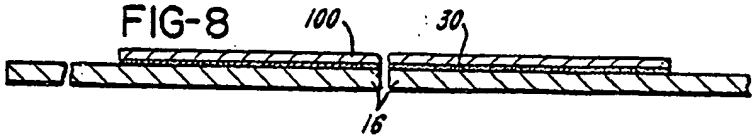


FIG-8



Gowling & Henderson

FIG-9

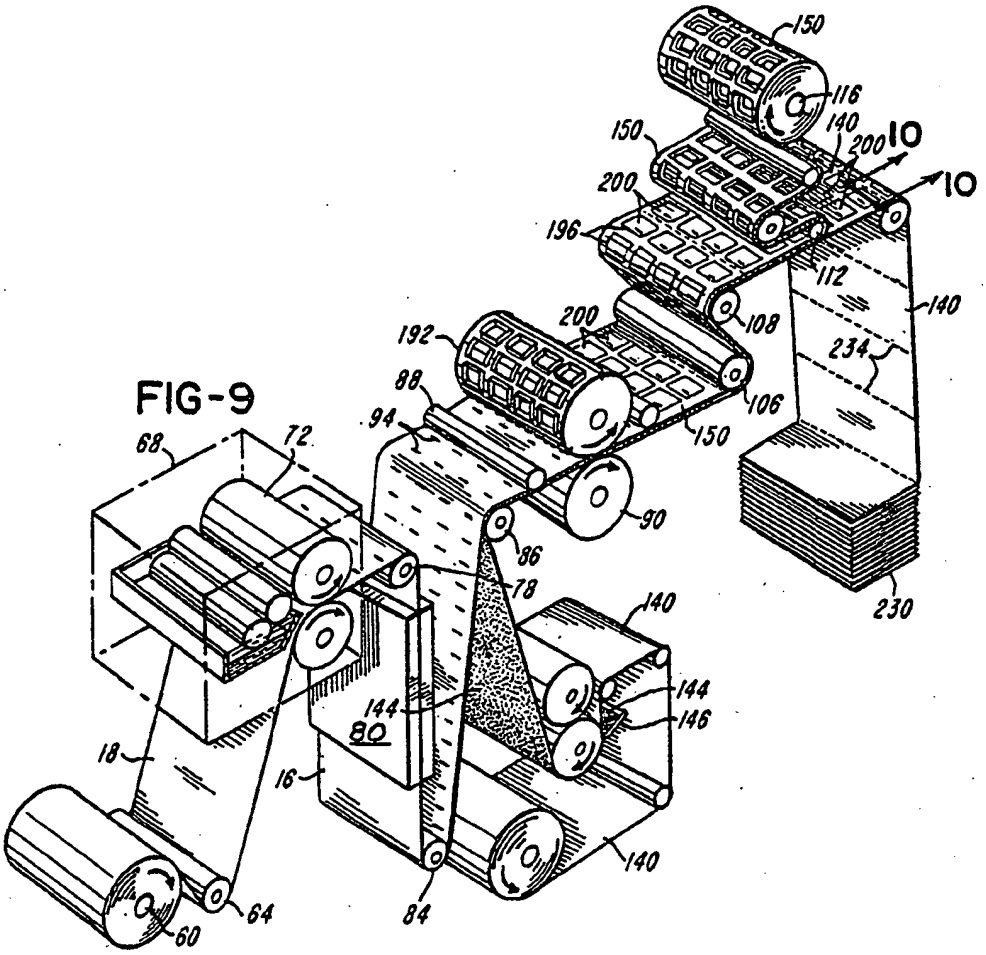
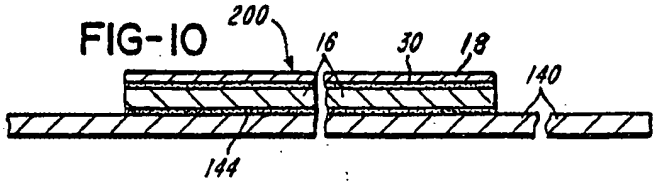


FIG-10



Gowling & Henderson